Visual attention in preterm born adults: specifically impaired attentional sub-mechanisms that link with altered intrinsic brain networks in a compensation-like mode.

Although pronounced and lasting deficits in selective attention have been observed for preterm born individuals it is unknown which specific attentional sub-mechanisms are affected and how they relate to brain networks. We used the computationally specified ‘Theory of Visual Attention’ together with whole- and partial-report paradigms to compare attentional sub-mechanisms of pre- (n=33) and full-term (n=32) born adults. Resting-state fMRI was used to evaluate both between-group differences and inter-individual variance in changed functional connectivity of intrinsic brain networks relevant for visual attention. In preterm born adults, we found specific impairments of visual short-term memory (vSTM) storage capacity while other sub-mechanisms such as processing speed or attentional weighting were unchanged. Furthermore, changed functional connectivity was found in unimodal visual and supramodal attention-related intrinsic networks. Among preterm born adults, the individual pattern of changed connectivity in occipital and parietal cortices was systematically associated with vSTM in such a way that the
more distinct the connectivity differences, the better the preterm adults’ storage capacity. These findings provide first evidence for selectively changed attentional sub-mechanisms in preterm born adults and their relation to altered intrinsic brain networks. In particular, data suggest that cortical changes in intrinsic functional connectivity may compensate adverse developmental consequences of prematurity on visual short-term storage capacity.